

Motorola[®] HOME Radio

SERVICE MANUAL

CHASSIS
HS-288

MODELS
51C1
51C2
51C3
51C4

GENERAL INFORMATION

TYPE - AC table model superheterodyne with appliance outlet and self-contained electric clock for controlling automatically the operation of the radio and the outlet.

RECEIVER MODELS -	Model	Color
	51C1	Walnut
	51C2	Ivory
	51C3	Tan
	51C4	Green

TUNING RANGE - 535 to 1620 Kc IF - 455 Kc

TUBE COMPLEMENT -	Type	Function
	12BE6	Converter
	12BA6	IF Amplifier
	12AT6	Det, AVC & AF Amp
	50C5	Power Amplifier
	35W4	Rectifier

POWER SUPPLY - Operates from 117 volts, 60 cycle, alternating current only. Power consumption 37 watts.



APPLIANCE OUTLET - For use with 117 volt AC appliances only, rated at 1100 watts or less.

CLOCK - Telechron self-starting electric clock (Telechron basic movement No. C-57, with Motorola face, hands, and escutcheon).

OPERATING INSTRUCTIONS

The locations and functions of the clock and radio controls are shown in Figure 1.

NORMAL RADIO OPERATION

Knob "A" on the clock turns the radio on or off. Select stations with the TUNING knob, and adjust volume with the VOLUME control.

A built-in loop antenna eliminates the need for an outside antenna in most locations. When receiving a weak station, rotate the receiver slightly for best signal strength. If additional pick-up is necessary, connect an external antenna to the radio by following the instructions printed on the rear panel. CAUTION: Never connect the radio chassis to a water pipe, radiator, or other ground.

CLOCK OPERATION

The clock will start as soon as the receiver is plugged into an electrical outlet. To set the hands to the correct time, rotate the TIME SET knob (on the rear of the radio) in a clockwise direction only.

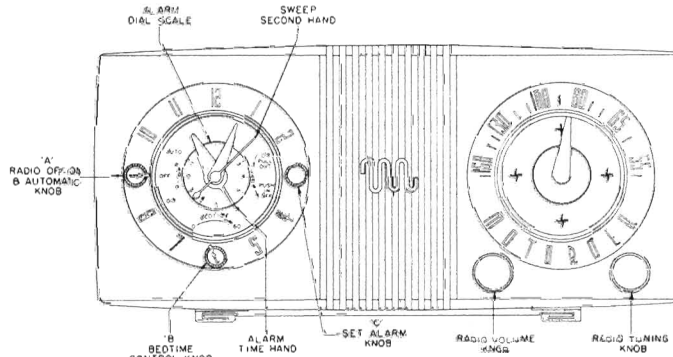


FIGURE 1. OPERATING CONTROLS

ALARM OPERATION

To set the alarm, pull out knob "C" and rotate it in a counterclockwise direction to the desired time on the alarm dial scale. The alarm will ring for one hour, or until knob "C" is pushed in. The alarm function is completely independent of the other controls on the clock.

4545 AUGUSTA BOULEVARD

Motorola Inc.

CHICAGO 51, ILLINOIS

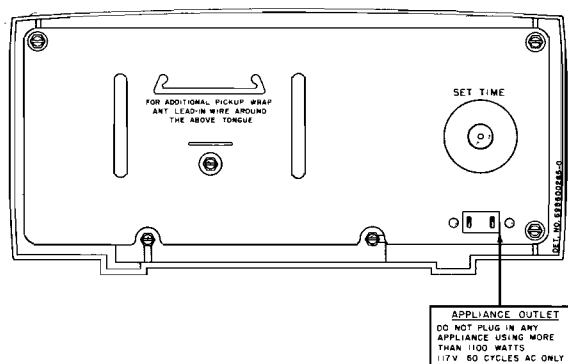


FIGURE 2. REAR VIEW

APPLIANCE OUTLET

To control an electrical appliance automatically, plug it into the receptacle on the back of the radio. See Figure 2. It will then be turned on or off simultaneously with the radio. **CAUTION:** Note that the rating of the outlet is 1100 watts or less.

If radio reception is not desired when operating the appliance, rotate the radio volume control to the minimum volume position.

BEDTIME CONTROL

The BEDTIME control will turn the radio and appliance off after any pre-set interval of time up to one hour.

Turn knob "A" to the "OFF" position and rotate knob "B" to any period of time between 0 and 60 minutes. The radio and appliance will be turned off automatically after the proper time has elapsed, and they will remain off until turned on again manually.

AUTOMATIC RADIO OPERATION

The clock controls may be pre-set to turn the radio on automatically at any time up to twelve hours in advance.

If an appliance is plugged into the receptacle on the back of the receiver, it will be turned on automatically, along with the radio.

Pull out knob "C", rotate it counterclockwise to the desired time on the alarm dial scale, and push the knob back in. Rotate knob "A" first to the "OFF" and then to the "AUTO" position. At the pre-set time, the radio will come on and will continue to play until turned off manually. The alarm will ring also if the knob "C" is left pulled out. The radio will come on first and, after an interval of about ten minutes, the alarm will ring.

BEDTIME AND AUTOMATIC OPERATIONS COMBINED

By combining the operations in the two sections above, the radio may be turned off automatically and on again automatically.

When setting the BEDTIME control, rotate knob "A" to the "AUTO" position instead of "OFF". **IMPORTANT:** It is necessary to turn knob "A" first to the "OFF" position before proceeding to "AUTO", otherwise the radio may not shut off.

ALIGNMENT

NOTE: It is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.
2. Connect the low side of the signal generator to B-.
3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.
5. Use a small fibre screwdriver for aligning the IF and diode transformers.
6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watt) across the voice coil to avoid overloading the receiver.
7. See Figure 3 for adjustment locations and the following chart for procedure.

ALIGNMENT CHART

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	-	-	-	Fully closed	-	Set pointer to horizontal position.
3.	.1 mf	Grid of conv. (pin 7, 12BE6)	1620 Kc	Fully open	5 (Osc)	Adjust for maximum.
4.	-	Radiation loop*	1400 Kc	Tune for max	6 (Ant)	Adjust for maximum.

*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep loops at least 12" apart.

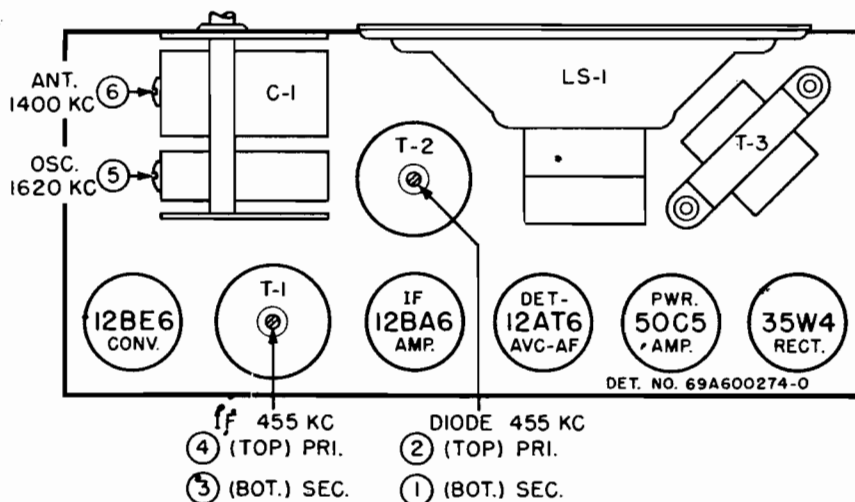
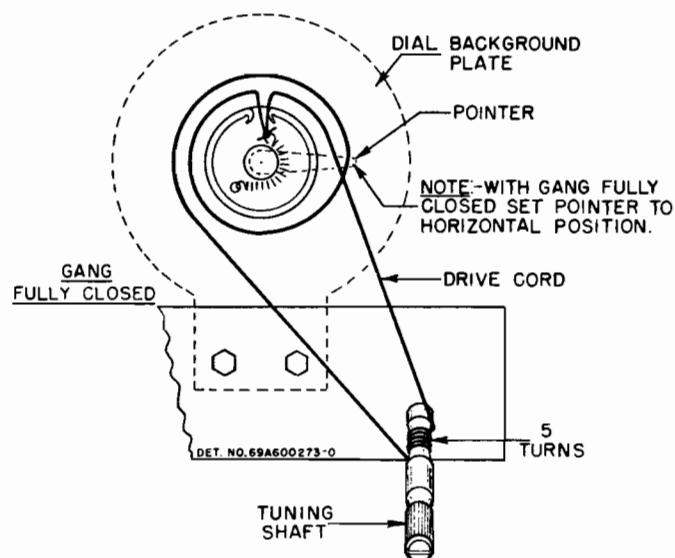


FIGURE 3. TUBE & TRIMMER LOCATIONS

FIGURE 4. STRING DRIVE DETAIL



SERVICE NOTES

TO REMOVE RADIO CHASSIS FROM CABINET

1. Pull off the two radio control knobs.
2. Remove the three hex head screws which hold the loop to the cabinet.
3. From the back of the cabinet, remove the two hex head screws at the rear edge of the radio chassis.
4. Slide the radio chassis and loop from the cabinet.
5. Disconnect the power leads to the radio chassis and to the appliance receptacle.

TO REMOVE CLOCK FROM CABINET

1. Remove radio chassis as above.
2. Remove the three nuts and lockwashers holding the shield behind the clock.
3. Slide the shield from the cabinet.
4. Turn the BEDTIME control knob to "60".
5. Pull out the ALARM set knob.
6. Turn the RADIO control knob to "AUTO".
7. While observing the clock from the back to avoid bending or breaking any parts, gently push the clock forward, at the same time twisting it slightly to eliminate binding.

TO REPLACE CLOCK DIAL FACE

1. Remove the clock from the cabinet as above.
2. Pull off the RADIO control and BEDTIME knobs.
3. Remove the ALARM set knob.
4. Remove the escutcheon and crystal.
5. Carefully pull off the three hands.
6. Remove the alarm dial and clock face.
7. Turn the radio control shaft to "AUTO" position.
8. Slowly rotate the time set shaft clockwise until the switch contacts behind the radio control shaft close.
9. Reassemble the clock face, alarm dial and three hands. Set all the hands to indicate 12 o'clock. Set the figure "12" on the alarm dial to index with the small pointer on the hour hand.
10. Replace the crystal, the escutcheon, and the knobs.
11. Check the automatic operation to be sure the switch contacts close at the time indicated on the alarm dial.

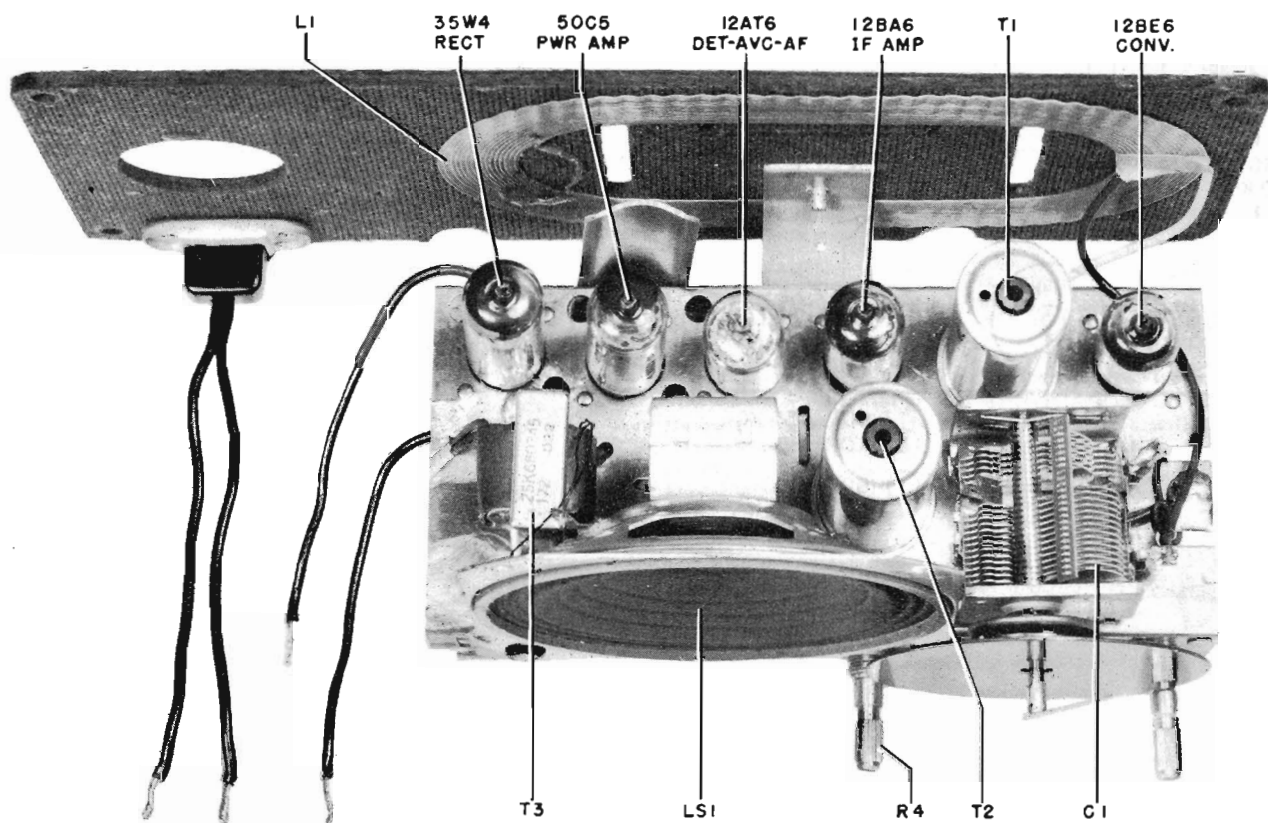


FIGURE 5. TOP VIEW OF CHASSIS

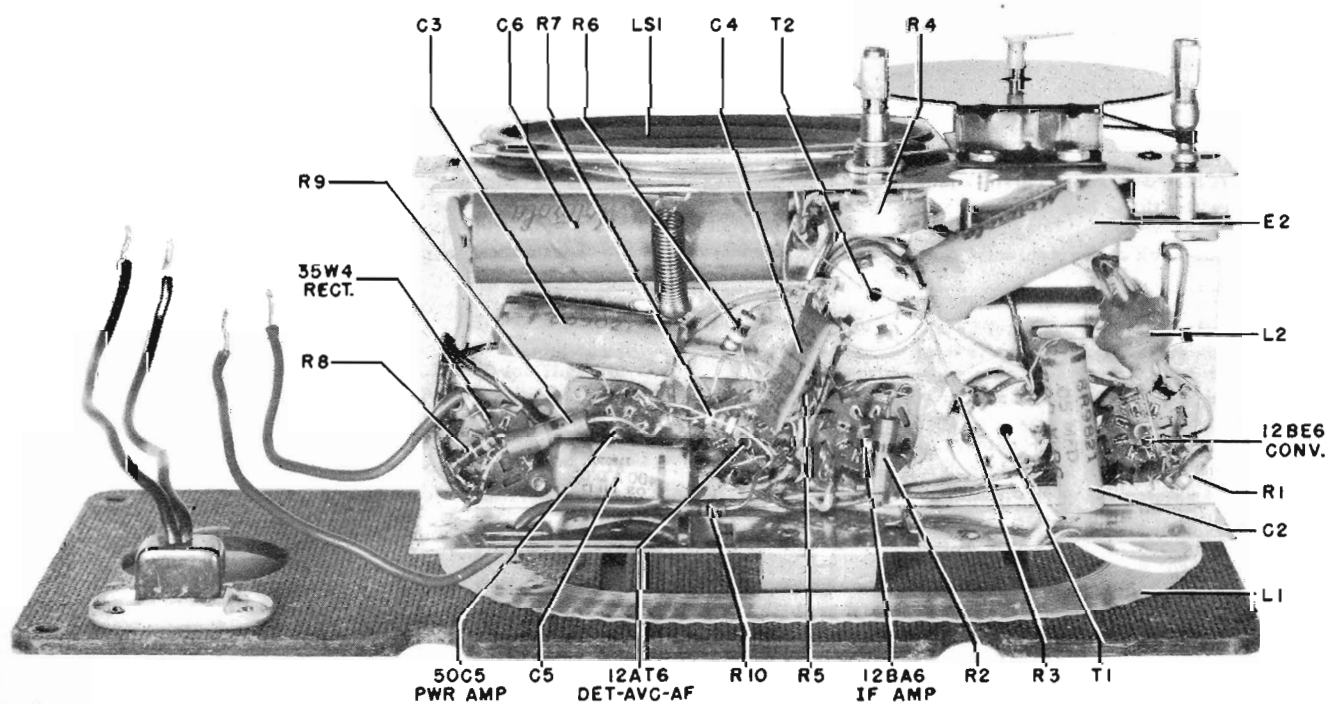


FIGURE 6. BOTTOM VIEW OF CHASSIS USING MULTIPLE CERAMIC CAPACITOR PLATE

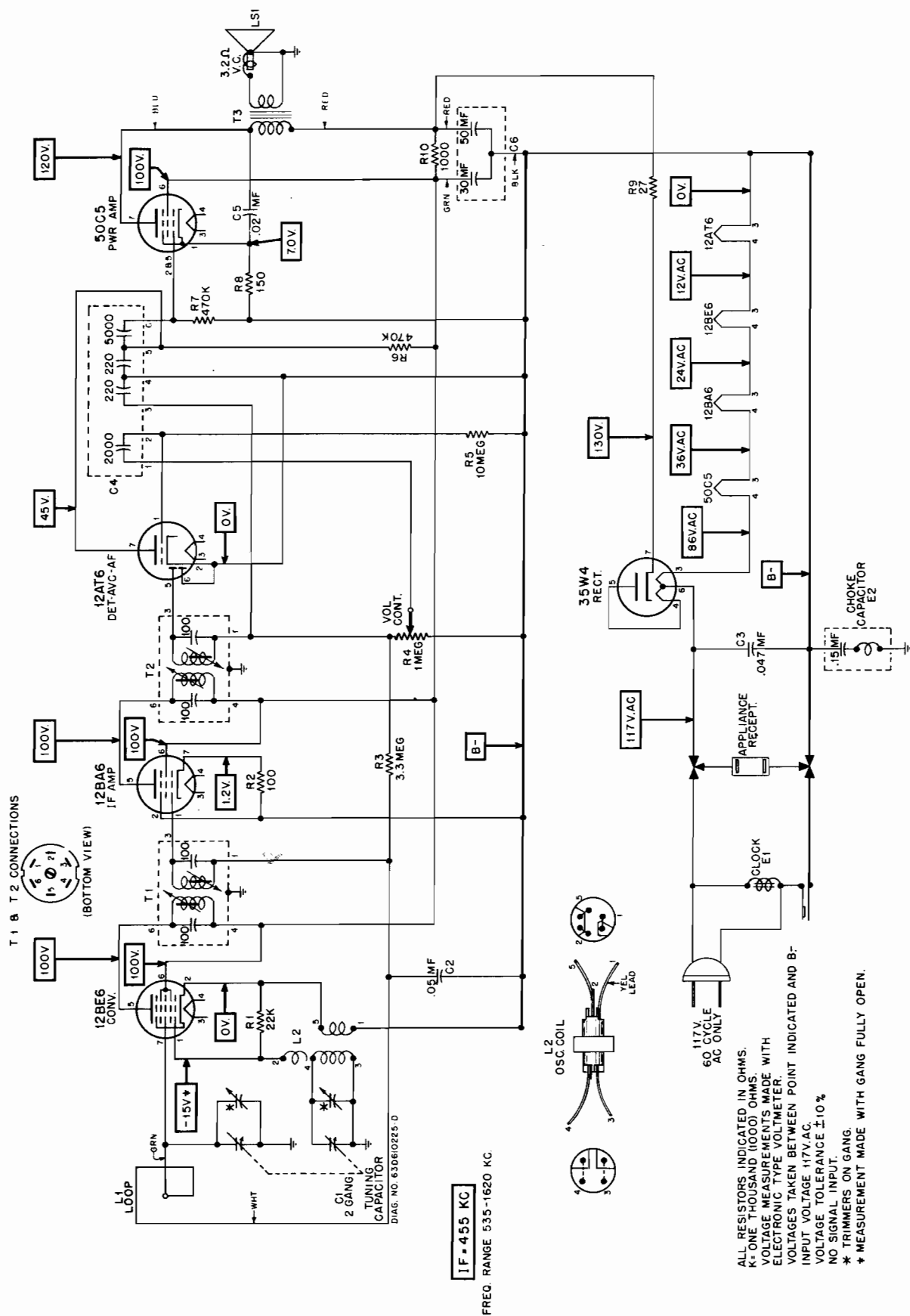


FIGURE 7. SCHEMATIC DIAGRAM OF CHASSIS USING MULTIPLE CERAMIC CAPACITOR PLATE

REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part,

Ref. No.	Part Number	Description	List Price	Ref. No.	Part Number	Description	List Price	
CHASSIS PARTS - ELECTRICAL				R-8	6R3992	150 20% 1/2W.....doz	1.20	
Capacitors				R-9	6R5683	27 10% 1/2W.....doz	1.20	
C-1	19B600021	Variable: 2 gang; with pulley	2.55	R-10	6R3953	1000 20% 1W.....each	.20	
C-2	8R9821	Paper: .05 mf 200V.....	.20	Transformers				
C-3	8R490232	Paper: .047 mf 400V.....	.25	T-1	24B482863	IF Transformer (brown dot): 455 Kc: complete with capacitor and cores; less shield.....	1.70	
C-4	21B482847	Ceramic, multiple: 2000-220- 220-5000 mmf/400V.....	.65	T-2	24B482865	Diode Transformer (red dot): 455 Kc: complete with capacitors and cores; less shield.....	1.70	
C-5	8R9802	Paper: .02 mf 400V.....	.20	T-3	25K680345	Output Transformer.....	1.05	
C-6	23B600855	Electrolytic: 50-30 mf/150V	1.10	CHASSIS PARTS - MECHANICAL				
Capacitor-Resistor				7A478118	Bracket, loop mtg.....			.05
CR-1	21B601007	Capacitor-Resistor: 2000-220 110-5000-110 mmf; 6.8 meg- 470,000-470,000 ohms.....	.85	7A77337	Bracket, tuning shaft.....			.05
Clock				42B482867	Clip, spring: blued finish (holds IF transformers).....			.25
E-1	59K610068	Electric Clock Assembly: Telechron movement No. C-57, with Motorola face, hands, crystal, escutcheon and knobs (for walnut cabinet) (51C1).....	12.95	5A484268	Grommet, speaker mtg: rubber....			.20
or	1X610107		exch 9.70	14A478119	Insulator, loop brkt mtg: fibre.			.15
	59K610067	Same as above except color (for ivory cabinet) (51C2).	12.95	4S7691	Lockwasher, internal: 3/8; cad pl (vol control mtg).....			.15
or	1X610109		exch 9.70	2A780465	Nut, knurled (vol control mtg)....			.05
	59K610064	Same as above except color (for tan cabinet) (51C3)...	12.95	64B610056	Plate, dial background: ivory.....			.55
or	1X610105		exch 9.70	52K610055	Pointer, dial (black).....			.15
	59K610059	Same as above except color (for green cabinet) (51C4).	12.95	9A601018	Receptacle, appliance (on loop panel).....			.50
or	1X610103		exch 9.70	3S7506	Screw, sheet metal: #6 x 1/4 PKZ plain hex head; cad pl (dial back- ground plate mtg).....			.50
Choke-Capacitor				47A600022	Shaft, tuning.....			.15
E-2	8A690487	Choke and .15 mf paper capacitor.....	.30	26K485936	Shield, coil (for IF transformers).			.20
Coils				26A478117	Shield, electrostatic (on rear of chassis).....			.55
L-1	1X610073	Antenna Loop, Panel and Receptacle Assembly: com- plete.....	1.95*	43A600095	Sleeve, paper (on pointer shaft) per/c.....			.50
	24K610072	Antenna Loop and Panel Assembly: less receptacle..	1.10*	9A472534	Socket, tube: miniature; 7-prong...			.15
L-2	24B680364	Oscillator coil.....	.90	41A73996	Spring, tension (electrolytic mtg).			.05
Speaker				41A73619	Spring, tension (gang drive cord)			.40
LS-1	50C600017	Speaker: 4" PM; 3.2 ohm VC.	3.00*	4A70015	Washer, "C" (tuning shaft mtg)per/c			.50
or	50B610052		exch 2.25	4S7633	Washer, flat: 9/16 x 11/64 x .033 stl; cad pl (loop mtg).....			.15
or	50C600857			14A11493	Washer, shoulder: fibre (loop bracket mtg).....			.35
Resistors				CABINET PARTS				
Note: All resistors are insulated carbon type unless otherwise specified.				16K600791	Cabinet, table model: plastic; walnut (51C1).....			3.75*
R-1	6R6028	22,000 20% 1/2W.....	1.20	16K600199	Cabinet, table model: plastic; ivory (51C2).....			4.75*
R-2	6R6018	100 20% 1/2W.....	1.20	16K610069	Cabinet, table model: plastic; tan (51C3).....			4.75*
R-3	6R2118	3.3 meg 20% 1/2W.....	1.20	16E600005	Cabinet, table model: plastic; green (51C4).....			4.75*
R-4	18A600018	Volume control: 1 meg.....	.80	28A600064	Connector, wire (connects clock & radio power leads).....			.05
R-5	6R2109	10 meg 20% 1/2W.....	1.20	61A600001	Crystal, plastic (radio dial cover)			.15
R-6	6R6032	470,000 20% 1/2W.....	1.20	13K600790	Escutcheon, radio dial: walnut (51C1).....			1.20
R-7	6R6032	470,000 20% 1/2W.....	1.20					

Part Number	Description	List Price	Part Number	Description	List Price
13K600197	Escutcheon, radio dial: ivory (51C2).....	1.20	CLOCK PARTS		
13K610058	Escutcheon, radio dial: tan (51C3)	1.20	<u>Note:</u> The following Motorola parts are for use with the basic Telechron clock movement No. C-57.		
13K600003	Escutcheon, radio dial: green (51C4).....	1.20	34K610061	Alarm dial: ivory.....	.25
14A16304	Grommet, fibre (on clock shield)...	.05	30K600980	Cord, line: with plug; 6 ft long...	.85
36K600787	Knob, radio control: brown plastic (51C1).....	.15	61A600001	Crystal, plastic (clock face cover)	.15
36K600192	Knob, radio control: ivory plastic (51C2).....	.15	34K610060	Dial face: ivory.....	.50
36K610054	Knob, radio control: tan plastic (51C3).....	.15	13K600789	Escutcheon, clock: walnut (51C1)...	1.30
36A600065	Knob, radio control: green plastic (51C4).....	.15	13K600196	Escutcheon, clock: ivory (51C2)....	1.30
13A792195	Medallion: brass (on front of speaker grille).....	.55	13K610057	Escutcheon, clock: tan (51C3).....	1.30
2S7019	Nut, hex: 4-40 x 1/4 stl; cad pl (clock shield mtg).....per/c	.50	13C600002	Escutcheon, clock: green (51C4)....	1.30
3S476083	Screw, machine: 6-32 x 5/16 slotted locking hex head; cad pl (radio chassis mtg).....doz	.15	52K610062	Hand, hour: black.....	.15
3S2991	Screw, machine: 6-32 x 1/2 plain hex head; cad pl (mounts loop to cabinet).....doz	.15	52K610063	Hand, minute: black.....	.15
1X600799	Shield, clock: with grommet (covers rear of clock).....	.55	52K601001	Hand, second: brass.....	.10
2S490840	Speednut: for 1/16" stud (medallion mtg).....doz	.15	36K600989	Knob, clock control: plain; threaded type; walnut (51C1).....	.15
11M488253	Tape, aluminum foil (inside top of cabinet).....per ft	.10	36K600988	Knob, clock control: plain; threaded type; ivory (51C2).....	.15
4S7633	Washer, flat: 9/16 x 11/64 x .033 stl; cad pl (mounts loop to cabinet).....doz	.15	36K610066	Knob, clock control: plain; threaded type; tan (51C3).....	.15
			36K600987	Knob, clock control: plain; threaded type; green (51C4).....	.15
			36K600986	Knob, clock control: with arrow; push on type; walnut (51C1).....	.10
			36K600985	Knob, clock control: with arrow; push on type; ivory (51C2).....	.10
			36K610065	Knob, clock control: with arrow; push on type; tan (51C3).....	.10
			36K600984	Knob, clock control: with arrow; push on type; green (51C4).....	.10
			36K601002	Knob, time set.....	.20

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*Plus Federal Excise Tax At Current Rate